

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

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12. April 2005

Goworld, Rechtsanwältin
Intellectual Property
ALTANA Pharma AG

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2005/050667

International filing date (day/month/year)
16.02.2005

Priority date (day/month/year)
17.02.2004

International Patent Classification (IPC) or both national classification and IPC
C07D471/14, C07D471/04, A61K31/435

Applicant.
ALTANA PHARMA AG

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

international application NO.
PCT/EP2005/050667

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2005/050667

Box No. V Reasoned statement under Rule 43b/s.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-11
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/EP2005/050667

Re Item V**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following document/s/:

- D1: US 2002/169320 A1 (SENN-BILFINGER JORG) 14 November 2002 (2002-11-14)
- D2: US-B1-6 503 923 (SENN-BILFINGER JOERG) 7 January 2003 (2003-01-07)
- D3: WO 98/42707 A (BYK GULDEN LOMBERG CHEM FAB ;GRUNDLER GERHARD (DE); SENN BILFINGER) 1 October 1998 (1998-10-01)
- D4: WO 01/72754 A (SIMON WOLFGANG ALEXANDER;BYK GULDEN LOMBERG CHEM FAB ; BUHR WILM () 4 October 2001 (2001-10-04)
- D5: WO 03/014123 A (BUHR WILM ;ALTANA PHARMA AG (DE); SENN-BILFINGER JOERG (DE)) 20 February 2003 (2003-02-20)

Novelty

The novelty of the subject-matter claimed according to both claims 5 and 6 (tricyclic imidazopyridines of general formula 2 and 2a respectively) vis-à-vis all the documents cited in the search report resides mainly in the fact that the tetrahydro part of the naphthalene system is unsubstituted whereas in all the documents cited (or at least all the examples present therein) show substituents at the relevant ring. This is valid for both the tricyclic systems as well as for the intermediates imidazopyridin-8-ylamine of general formula 1 according to claim 1.

Novelty can be thus formally acknowledged.

Inventive step

The problem underlying the present application appears to reside in the provision of further tricyclic imidazopyridine derivatives of general formula (1) which exhibit marked inhibition of gastric secretion and an excellent gastric and intestinal protective action distinguished by a high selectivity of action, an advantageous duration of action and the absence of significant side effects (page 26 of the description).

Many compounds are known from the cited prior art which are structurally very closely related being imidazonaphthyridines (see compounds both D1 ,D2 or D3) or with X=NH also described by way of examples as in D4 and also suitable for the prevention and treatment of gastrointestinal diseases.

In many documents cited data are given (see the specific passages quoted in the search report) which show that

- a) the compounds already known so far have an excellent pharmacological profile and
- b) that many variants of this specific tricyclic system(s) substituted at the 7- and/or 8-position have particularly advantageous properties.

It follows that i) the problem underlying the present application as stated by the applicant on page 26 of the description has been already solved by many compounds from the prior art known so far and additionally ii) that exactly the presence of substituents at the relevant positions is responsible for the better activity.

The applicant on page 1 refers to document D5 wherein, however, compounds with X= NH were not described by way of examples. This aspect would justify the acknowledgment of the claimed sub-class as being selected therefrom.

However, from D1 to D4 imidazonaphthyridines have been prepared with a broad variety of substituents.

Therefore also Claims 1 to 4, relating to intermediate products, do not fulfil the requirements for patentability, since:

- a) the claimed intermediates take part in a process for the preparation of subsequent products which do not appear to be patentable, and
- b) the mentioned intermediate does not give a "structural contribution" to the subsequent product.

The applicant is kindly requested to take position on that and to convincingly show that the solution proposed according to claim 6 (compounds of general formula 2a) is indeed a response to the need for superior properties to the compounds

known from the prior art.

An inventive step cannot be recognized.

Re Item VIII

Certain observations on the international application

Claim 2 does not differ in any single substituent definition from claim 1 and appears to be redundant. The applicant is kindly requested to delete it or reword it (as eg in the original version filed as Ep04003467).